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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/843,781	04/30/2001	Woo Hyuk Choi	041501-5423	1083

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EXAMINER

QI, ZHI QIANG

ART UNIT PAPER NUMBER

2871

DATE MAILED: 03/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/843,781

Applicant(s)

CHOI, WOO HYUK

Examiner

Mike Qi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 9 is objected to because of the following informalities:

Claim 9, recitation "... a scan line crossing the scan line ..." should be changed into - - ... a scan line crossing the data line ... - -.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 5, 8-9, 13, 16-20 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,303,074 (Salisbury).

Claims 1, 9, 17 and 22, Salisbury discloses (Col.7, line 42 – col.10, line 60; Fig.2B) a repair structure for a thin film electronic display such as liquid crystal display (LCD) that the scan line or data line is required to isolate a short circuit at the crossover point between the scan line and the gate line, in which the repair structure comprising:

- data line (103) and scan line (102) and crossing each other;
- scan line (102) can be shorted to the data line (103) at crossover point (118), and the scan line (102) has been severed at severance points (160A, 160B) to electrically isolate the portion of the line with short circuit

(150) from remainder of scan line (102) (such that the scan line having first, second and third segments, wherein the second segment "the middle portion" is an electrically isolated from the first and third segments and located at a portion where the scan line and the data line overlap) (see Salisbury in col.8, line 60 – col.9, line 20 and Fig.2B);

- repair lines (122, 123) are electrically insulated from the scan line (102) and data line (103) by a dielectric material (such that the repair pattern electrically isolated from the second segment of the scan line) (see Salisbury in col.7, line 65 – col.8, line 3);

(concerning claims 17 and 22)

- scan repair line (122) is electrically coupled to its associated scan line (102) at selected location (135) and at the opposite end of scan line (102) (the electrical coupling typically are through contact hole such as the contact (143)), thereby providing a path for electrical signal to be conducted to active components connected to scan line (102) on either side of now isolated segment of the scan line containing shorted area (150) (see Salisbury in col.9, lines 7-20 and Fig.2B);

(concerning claims 1 and 17)

- the data line (103) can be bypassed by coupling the data repair line (123) to severing the data line (103) and connecting the selected points (see Salisbury in col.9, lines 21 – 49 and Fig.2B), such that, similarly, the data line (103) also can be shorted to the scan line (102) at crossover point

(118), and the data line (103) would have been severed at severance points (like the 160A, 160B) to electrically isolate the portion of the line with short circuit (150) from remainder of data line (103) (such that the data line having first, second and third segments, wherein the second segment "the middle portion" is an electrically isolated from the first and third segments and located at a portion where the scan line and the data line overlap).

Salisbury discloses all the limitations required in the claims 1, 17, 9 and 22 except for that Salisbury do not expressly disclose the scan lines and the data lines are on a substrate, and the data line or the scan line having first, second and third segments, and the repair pattern electrically isolated from the second segment and electrically connecting the first segment with the third segment of the data line or the scan line using exactly same wording.

However, Salisbury discloses the repair principle and mainly teaches the scan line (102) has been severed at severance points (160A, 160B) to electrically isolate the portion of the line with short circuit (150) from remainder of scan line (102), and that is the same principle as the scan line having first, second and third segments, and the repair pattern electrically isolated from the middle portion (second segment) and electrically connecting the first segment with the third segment of the data line or the scan line. Conventionally, the data lines and scan lines are on a substrate for the liquid crystal display. Even though Salisbury mainly teaches the scan line has been severed, but Salisbury also indicates that, similarly, the data line (103) also can be shorted to the

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scan line (102) at crossover point (118), and the data line (103) would have been severed at severance points (like the 160A, 160B) to electrically isolate the portion of the line with short circuit (150) from remainder of data line (103).

Salisbury indicates (col.1, line 48 – col.3, line 40) that a short circuit between a data and a scan line leads to inaccurate signals being applied to all switching transistors connected to either of the shorted data or scan lines, so that would leads defective display, and such structure would isolate a portion of one line to correct a short circuit in the device, especially, as display device become large with increased numbers of scan and data lines, and as higher resolution is required of the device as a whole, fewer inoperative pixels can be tolerated, such that would increase the production yields.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a repair pattern as claimed in claims 1, 17, 9 and 22 for repairing short circuits between scan line and data line so as to correct a short circuit in the device, especially, as display device become large with increased numbers of scan and data lines, and as higher resolution is required of the device as a whole, fewer inoperative pixels can be tolerated, such that would increase the production yields.

Claims 8 and 16, Salisbury discloses (col.7, lines 65-67) that the repair lines (122, 123) are electrically conductive, and using the conductive material such as metal as the repair pattern that would have been at least obvious.

Claim 18-19 and 23-24, Salisbury discloses (col.7, lines 48 – 51) that severing or cutting (electrically isolating) of a transmission line (such as the scan line or the data

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line or forming a contact hole) is normally accomplished with a laser cutting, and that would have been at least obvious.

Claims 5, 13, 20 and 25, Salisbury disclosed (col.7, line 65 – col.8, line 3) that electrically insulating conductive lines are typically by forming an intermediate layer of dielectric material ^{SiO₂ SiNx} between the conductive lines. Therefore, using insulating material to fill the portions between the severing segments of the data line or the scan line as claimed in claims 5, 13, 20 and 25 would have been at least obvious.

4. Claims 2-4, 6-7, 10-12 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salisbury as applied to claims 1, 5, 8-9, 13, 16-20 and 22-25 above, and further in view of US 5,459,410 (Henley).

Claims 10-11 and 14, Henley discloses (col.11, line 65 – col.12, line 6; Fig.12c) a cross-short repair structure that the scan line (15) is cut at locations (80,82) to sever the short circuit, and using laser removes passivation from the scan line in areas (84,86) to form a conductive bridge (88) which contacts each area (84,86) without shorting data line (13). Because the gate line (scan line) and the data line form the pixel region. Therefore, the repair bridge (88) must bypass to pixel electrodes adjacent to the scan line and having a portion overlapping the pixel electrodes. In order to avoid short-circuit the bridge (88) to the pixel electrodes, the overlapping portion of the pixel electrodes with the bridge (88) must be isolated from other portion of the pixel electrodes, and the repair bridge (88) has a "I" shape. Henley indicates (col.2, lines 15-18) such repair structure improving the production yields, especially, for assembling high density active matrix LCD panels.

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Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a repair pattern as claimed in claims 10-11 and 14 for improving the production yields of the high density active matrix LCD display.

Claims 2-3 and 6, Henley indicates (col.12, lines 4-6)^{Fig. 12c} that the same procedure is employed wherein the data line (13) is cut and bridged. Therefore, the repair pattern bypasses to pixel electrodes adjacent to the data line as claimed in claims 2-3 and 6 would have been an obvious variation.

Claims 4, 7, 12 and 15, using the same principle to cut the scan line or the data line along the upper portion of the scan line or the data line, and severing into segments to repair the cross-short circuit line between the scan line and the data line, and the repair pattern must be "I" shape, and that would have been an obvious variation.

5. Claims 21 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salisbury as applied to claims 1, 5, 8-9, 13, 16-20 and 22-25 above, and further in view of US 5,407,701 (Baum et al).

Claims 21 and 26, Baum discloses (col.1 line 30 – col.2, line 42) that using laser-induced chemical vapor deposition (LCVD), a focused laser is utilized to heat the surface of a substrate at an open region between two separated circuit lines in the presence of a gaseous reactive compound, so that the formation of an interconnecting circuit line has high electrical conductivity and high metallic purity without any carbon/oxygen incorporation.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use laser-induced chemical vapor deposition for the repair

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pattern as claimed in claims 21 and 26 for achieving high electrical conductivity in the formation of the interconnecting circuit lines such as the data line or the scan line.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703) 308-6213.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Mike Qi
February 24, 2003

TOANTON
PRIMARY EXAMINER